

Hobbies

WEEKLY

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Get into shape for long rides with this BICYCLE EXERCISER

BAD weather need not deprive any cyclist of his favourite exercise if he makes the appliance illustrated. It can act as an ordinary stand for the machine, with the advantage of allowing the cyclist to mount the bicycle and pedal away for all he is worth and yet not shift from the stand. It is quite simple, as the rear wheel of the bicycle rests upon a pair of rollers and so never moves forward.

The Timber Needed

A side and plan view of the exerciser stand is given in Fig. 1. It is made up mostly of 1in. by 3in. timber, which can well be just common deal. Cut the ground timbers, A, to the length given, from 1in. or $\frac{3}{4}$ in. by 3ins. wood.

These are tenoned into end pieces, B, as shown at C, in Fig. 2, and are spaced just 4ins. apart. The end pieces have their ends bevelled off a little, they look neater so. At the front, a verticle strip of wood, D, 4ins. wide, is fitted between the ground timbers, and there firmly screwed.

The whole should be strongly glued together, if the tenon and mortise joints are a close fit, no nails need be employed.

A strip of deal 6ins. wide is now nailed over the ground timbers, with its fore end butting up against the part, D. This supports the front wheel of the bicycle, which rests upon it as a platform.

It is necessary to prevent this

front wheel moving sideways during the action of pedalling, so sloping wing pieces, E, are cut and screwed to D and the platform, as seen in the diagram. Screwing these to the platform is more easily accomplished if reasonably long screws, say, 2in. ones are driven in from underneath. Construction thus far is shown in detail Fig. 2, which should make all points clear.

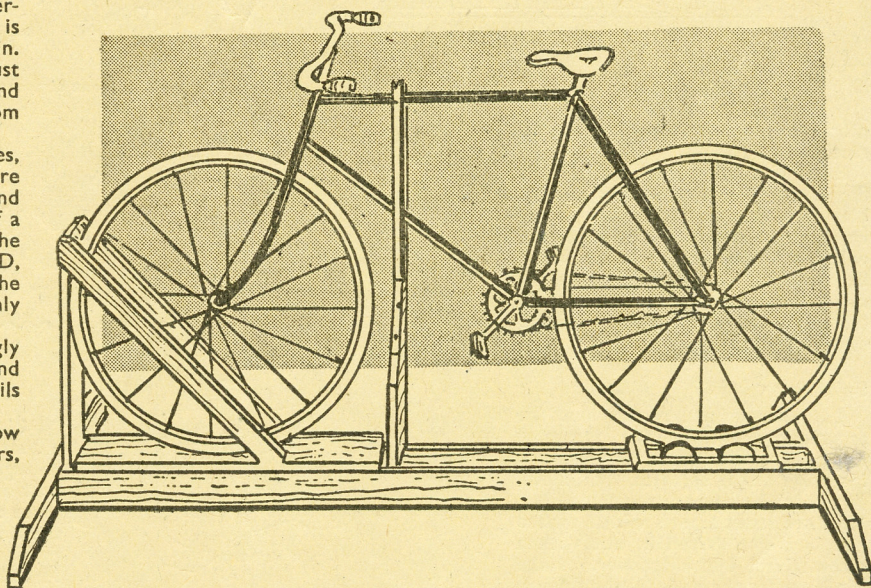
Fitting the Rollers

Fig. 3 shows how the pair of rollers is made and fitted. A frame-

work of 1in. square wood is made to dimensions given, with a tongue and groove corner joint. Screw these joints together so that one side of the frame, at least, can be removed for insertion of the rollers.

The bearings for the rollers are a pair of $\frac{1}{2}$ in. mild steel plates, cut to length at F and drilled as shown. Two extra holes are also drilled in each plate for the screws fixing them inside the frame. The bearing holes for the rollers are, of course, drilled to suit the spindles naturally.

These plates are now screwed



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inside the frame, and great care must be taken to ensure getting the bearing holes for the rollers truly in alignment, as these rollers must revolve quite freely. To ensure this, the plates should be screwed together and the bearing holes drilled through both at one operation.

The plates should also be cut to exactly the same length each, then if pencil lines for a guide are squared across the frame, accurate fitting should not be a difficult task at all.

For Smooth Running

Mark the position of the bearing holes in the frame by inserting a pencil and making a small dot, then unscrew the plates and on the pencilled marks on the frame, bore $\frac{3}{8}$ in. holes right through. This will make the rotary action of the rollers smoother, by removing any wood from the holes so the spindles of the rollers move only in the bearing holes of the plates.

The rollers, G, are made to fit easily between the sides of the frame, and allowance should also be made for a thin metal washer at each end, to reduce friction. The rollers are cut from 2 in. diameter round wood rod. Short

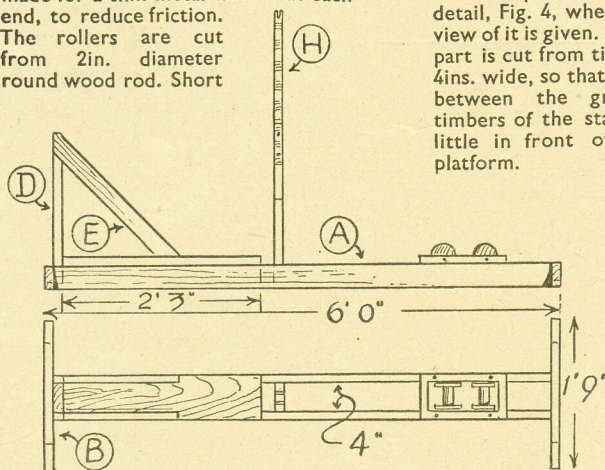


Fig. 1—Side and plan view of parts

pieces from a curtain pole would do nicely.

Each piece is provided with a flange each side, measuring 4 ins. diameter, so that the flanges by rising above the rollers at least 1 in., will keep the rear wheel of the bicycle from riding off. The flanges can be cut from any thin hardwood, but would be better made from $\frac{3}{8}$ in. steel or brass plate.

Spindles

Both flanges and rollers must be accurately centred—this is most important—and should be drilled for insertion of the spindles. For these, $\frac{1}{4}$ in. coach screws are recommended. They are stout screws with a square end, and are driven in not with a screwdriver, but a spanner. Make the holes for them $\frac{1}{4}$ in. in the flanges, but a trifle less for the rollers, then drive them in. Fix the flanges to the

ends of the rollers with small nails or screws.

File off the square ends of the coach screws, to leave spindle ends some $\frac{3}{8}$ in. long. Now fit the rollers inside the frame, and see they rotate quite freely on a touch of the fingers. A spot of oil will help.

Trial Run

The bicycle should now be lifted on to the stand with its front wheel against post, D. Place the roller frame beneath the rear wheel of the bicycle, and when in its right position, that is with the wheel resting equally on both rollers, screw it to the stand.

Now try it, and if satisfactory, a twist of the pedals should cause the rear wheel to revolve quite easily and the rollers also. See no catch occurs anywhere and also take notice that both rollers should turn together, which they certainly will if the bicycle wheel rests upon them evenly.

To keep the machine upright, a simple support is provided. This is shown in position, in Fig. 1, H, and in detail, Fig. 4, where a side and front view of it is given. The lower wooden part is cut from timber 4 ins. wide, so that it fits between the ground timbers of the stand, a little in front of the platform.

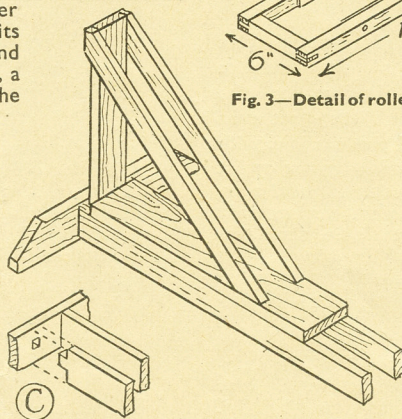


Fig. 2—The front support framework

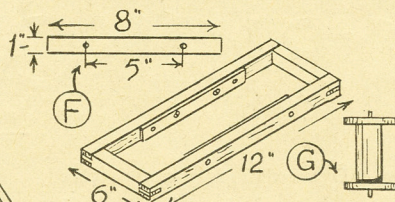


Fig. 3—Detail of roller bearing movement

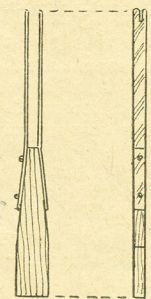
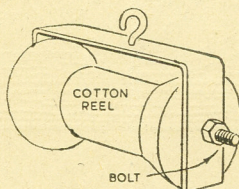


Fig. 4—The centre support

Its exact length, which is not critical, is obtained from actual measurement with the bicycle in position, and it should be just long enough to reach from the floor to about 3 ins. below the lower bar of the bicycle. At its top it should be about 1 $\frac{1}{2}$ ins. wide, and from there is

The bicycle is fitted in by lifting the front wheel until the machine can be dropped in the support, H. A bolt is slipped in the slots at the top of H, and is there tightened up to close the metal strips firmly over the top bar of the machine.



Cotton Reel Pulley

ALL you need is a cotton reel, a strip of tin, a small bolt long enough to reach through the reel with about $\frac{1}{2}$ in. to spare, a nut, and a piece of wire. Make a double bend in the tin as shown, far enough apart to prevent rubbing against the reel. Make holes in the tin and fix as shown.

Patterns and particulars on how to make a miniature TIMBER LORRY

WHEN you have got your oddments of wood and card together for making these vehicles, you will probably have little else to find for making this realistic vehicle. The style of the front is a bit different from the one we have already published, but if anything, a little more simple. The patterns are shown full size (page 270) so you can mark them on the material.

Cabin

The cabin can be made from thick white cardboard or $\frac{1}{8}$ in. plywood. Start by making the lower front as in pattern A, which measures $1\frac{1}{2}$ ins. wide and $\frac{3}{4}$ in. high. Note the cut-away to allow for the motor case-ment. In the pattern B is the floor, with wheel cut-outs for $\frac{1}{2}$ in. wheels. This means a clearance of $\frac{1}{8}$ in. to allow the wheels to revolve freely.

Next prepare the two sides as seen in C, with cutaway for the wheels and windows as shown. Note the neat arrangement of the windows, which gives good all round vision, so necessary in such vehicles.

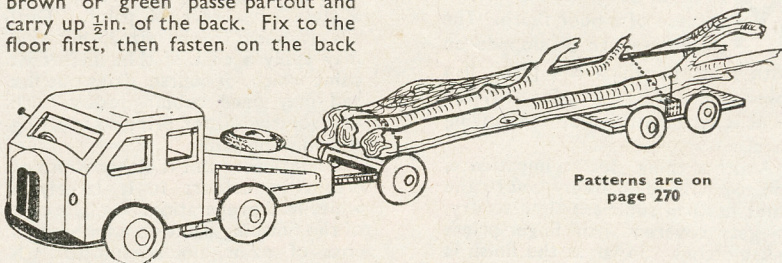
The next part is the back, shown at D and again with a fairly large rear window. This is important in view of the work actually undertaken when loading and unloading.

Interior Painting

At this stage it would be a good plan to paint all the interiors of these parts before you assemble them. Light brown or oak water paint is a good colour to use, and light green or buff can be used if desired.

To help you in construction, next cut the seats from $\frac{1}{8}$ in. square wood the width of the floor and well rounded at the front. Cover with

brown or green passe partout and carry up $\frac{1}{2}$ in. of the back. Fix to the floor first, then fasten on the back



Patterns are on page 270

firmly. This will help you to fix on the two sides and check up the measurements, because this may slightly alter, according to whether you use cardboard or thin wood.

If you have made the cabin of the first article we gave recently, this one should be easy. The sketch at E gives you a good view of the assembly and the shape of the front driving panel. Adjust this to fit in and line it with transparent material. Note the shape of the bonnet which you may design to your idea, although, as a rule, these vehicles are of Leyland heavy type service class chassis. Sometimes we see the famous Foden Diesels and these have a pattern of their own.

Rounded Roof

Note the buffer panel which can be made from $\frac{1}{8}$ in. wood well cleaned and rounded. The roof should be from $\frac{1}{4}$ in. smooth wood so you may round this off thoroughly. Use plenty of glasspaper and dome it off well. All modern cab roofs are well sloped and good to look at.

The rear section seen in E is $1\frac{1}{2}$ ins. long and about $\frac{1}{2}$ in. high at back and $\frac{3}{4}$ in. at front, with the customary wheel shaping. Cover over with thin card to enclose it, or you may leave it open and show lifting and haulage tackle in the shape of wire crowbars

and thin twine. If enclosed, fix on one spare wheel.

The chassis and bearers can be made with stripwood of $\frac{1}{8}$ in. thickness with cross members of $\frac{1}{8}$ in. also. These do not protrude back and front. Fasten a tow-hook on the back from a large bent pin.

In pattern F is seen the front axle unit. The top bearer is $\frac{1}{4}$ in. square to take the weight and the lower one the same. The top one is $1\frac{1}{2}$ ins. wide and lower $1\frac{3}{4}$ ins. to allow for wheel clearance.

Pin Parts

The centre is held with a strong pin. Fit a small washer between the two sections. Two stout pins in each end of the top section must be fitted to hold the logs. The towing section can be cut from thin plywood and fitted by turning over ordinary household pins. Use $\frac{3}{8}$ in. wheels, and as there are no mudguards it makes the model easier to build.

The rear section is a twin axle fitment and first part to make is the square of thin plywood $1\frac{1}{2}$ ins. square (see G). The axles are $1\frac{3}{4}$ ins. long to correspond with the front. In the sketch, H, is shown the system of holding the cross bearer together and so preventing strain when loaded. Note the angle blocks each side.

Connecting Rod

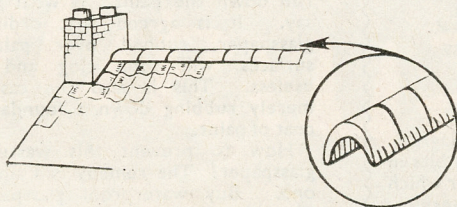
The two sections are now hitched together by a length of $\frac{1}{4}$ in. square wood, which fits in through a hole in the front cross section and then through the centre of the back cross bar. This piece should be about 5 ins. long and mostly extends through the rear section a little. It can be adjusted by making tiny holes and inserting a small pin through cross ways.

Realistic "trees" can be cut from small twigs, but choose them to look like those usually seen on these loads. These of $\frac{1}{8}$ in. diameter are about the right size.

Lamps, petrol tanks, thin chains, hooks and gear can all be added to suit the builder's own ideas. The colour suggested is green all over or red cab and green truck.

Ridge Tiles for a Doll's House

IN constructing a doll's house I have greatly improved the general appearance by adding ridge tiles in the following method. When I had the roof assembled a sheet of newspaper was pasted and folded in narrow strips from top to bottom. This results in a pliable paper rod the width of the page. While still pliable it was moulded to the angles by pressing it along the ridge of the roof. It was then left to dry. When dry it was light and rigid.



It was then covered with roof paper and glued to the roof after the roof was papered. This gives an outstanding finish and adds strength to the roof—the ridge joints being neatly mitred together. (A.G. Capel, South Ruislip, Middlesex).

Practical hints on how to get the most satisfactory FINISH FOR TOYS

MANY a good toy is spoiled because of a poor finish. The paint seems to be slopped on with a brush, which is a pity. If a "working" type of wooden toy, the paint is sure to stiffen up the moving parts.

Another thing, due to impatience, the toy is handled freely before the paint has had sufficient time to dry, so gets covered with finger-prints and blotches. So far as the finish is concerned, some toy-makers seem to lack thought in the matter. If a tin of green oil paint happens to be handy, it is used on almost everything.

A toy car, for example, will be entirely green—wheels and all! Silly, is it not? For some unknown reason, some fellows cannot be bothered buying a tin of suitable paint. No, the tin of green stuff, if available, is used.

So, the sticky oily paint is slopped on. Perhaps it was thick in the tin and needed thinning. In goes some turpentine, and perhaps some linseed oil. A bit of stirring with a stick—and the paint is as good as new.

As more experienced readers know, however, the paint is not as good as new. It will be hours before it will dry, because of the omission of driers.

One-colour Toys

Wooden toys and novelties are seldom painted a single colour. A glance at the "professional" toys and novelties in shop windows will show that there is a great deal of variety in colour. Colours are bright—and natural. And one thing you can be sure of is that *oil* paint is not used. Oil paint is for back doors.

Good quality enamels or cellulose paint is generally used as a finish, i.e., where the "quality" toys are concerned. After all, a toy worth making is worth finishing properly. Most home-made toys are excellently constructed; it is the finish which spoils the majority of them.

"How can I get a professional finish on toys?" is what you may want to know. Well, you certainly cannot expect to get a good finish on a cheap wood such as deal, even though you might have its surfaces and edges quite smooth. As in french polishing, a form of "filler" is needed to prevent absorption, particularly at the softer patches of the wood, and its end grain.

Deal needs to be sized before applying a paint. A thin glue size will suffice. It should be luke warm when applied, then allowed to dry, after which the slight roughness is smoothed out by lightly rubbing with fine glasspaper. The sizing is

necessary whether you are applying a stain or a coat of paint. Deal always needs to be sized, but one may apply a coat of thin undercoat paint which, of course, dries out flat and may need rubbing down with fine abrasive paper prior to applying the finishing paint.

Under-coat paint is either white or cream in colour; it is largely a white-lead preparation. A single coat of the finishing paint on a foundation coat of paint almost suffices. If using enamel paint, the latter will dry with a high gloss, as there is no absorption.

The Cellulose Finish

While enamel paint is still a firm favourite means of finishing toys and novelties made from wood, it is unsuitable for some items. Lead soldiers, guns, etc., should not be enamelled. A more suitable finish is cellulose paint. This is obtainable in bright colours, and is easily applied and has the advantage of drying quickly. Moreover, the colours remain bright; enamel is apt to get dull and chip easily.

Cellulose paint on wood or metal ensures a good finish, if properly applied. Respecting working novelties, each part will need to be treated independently, which means that the toy must be disassembled, the parts treated, then put together again.

This means extra time and care. How different from brushing on paint with the parts still fixed together? You cannot expect to obtain a neat smooth finish with the parts together.

One very noticeable blunder in regard to home-made toys is lack of realism in colour. Now, there should be some naturalness in the

colours, particularly in the case of animals.

You have all seen—or even made—the old-fashioned monkey-on-a-stick toy. Did you ever see a green monkey, however, or even a red one? Alas, it happens very often that children play with green or red monkeys. Brown, of course, is a more suitable colour, with the stick red or green.

A Good Guide

If you must make your own toys as gifts, or as a money-making sideline to your usual occupation, be wise and study all the professional-made toys you see in shop windows. It is always worth buying one of these toys, just to see how it may be made and finished. But do not copy them exactly, for their design may be protected by patent.

Generally, the amateur uses a cheap wood such as deal, pine, or red cedar. The best toys are made from a hardwood, such as birch or beech. That is why the toys look better, feel stronger, and have a more attractive finish than the toys made from a soft timber. With birch or beech, no sizing or filler is really needed. The wood is close-grained and a single thin application of the finish, which might be clear varnish, polish, lacquer, etc., usually suffices. If you have always been using a soft wood for making toys and novelties, try switching over to a hardwood, and see that all surfaces and edges are quite smooth.

The Secret of Good Finishing

The secret of good finishing, incidentally, is in the method of application—and the thickness of the finishing paint. A thick coat is wrong. Two or three thin applications—which takes longer—will give better results, especially if each coat (excepting the final coat) is allowed to dry and rubbed down with fine glasspaper.

If using enamel paint or cellulose paint, and the work is fairly large, a spraying outfit is a real blessing. However, one can brush on the finish. The rubbing down is apt to worry some readers.

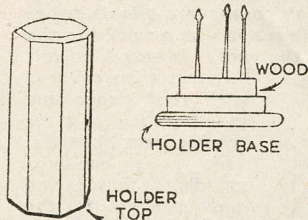
"It will take quires of glasspaper to rub down the paint", is what they say. It is agreed that ordinary glasspaper, rubbed over painted surfaces, will soon clog and be useless. This is also the case if merely rubbing down a foundation coat of paint.

How to prevent this waste of glasspaper? The remedy is a simple one. Buy waterproof glasspaper. The painted surface is sponged with

(Continued foot of page 265)

Drill-Bit Holder

THIS tip is very useful in preventing drill-bits from getting broken. All you need is a long shaving stick container and a small block of wood. Cut the wood to size and fit in



bottom cap, as shown in diagram. Drill a few holes and put drill-bits in tight. This provides a container which is very neat as well as being serviceable.

A useful addition to any household is this PAIR OF FOLDING STEPS

A PAIR of folding steps is absolutely invaluable in any household, and such a pair as shown in Fig. 1 would be quite cheaply made.

The great advantage of having them to fold is that they take up so little space while not in use. The steps shown only project a matter of 10ins. or so from the wall.

The total height of the steps is 2ft. 3ins. and there are three steps of easy rise of 9ins. The width of tread is again ample, and is 15ins. between uprights, while the top tread, when the steps are opened, measures 17ins. long and 11ins. wide. These measurements make for a thoroughly useful household article, serving for the cleaning or painting of windows, shelving, blinds, etc., and those many places which are just out of reach in the ordinary way.

Secondhand Timber

Any kind of good salvaged wood about $\frac{3}{4}$ in. or $\frac{1}{2}$ in. thick may be used throughout, and it may be either scrubbed clean and creosoted at completion, or may be painted two coats.

Four uprights, A, are first prepared, and the shape of one (the other three being marked out from it) may be easily set out from the simple detail shown in Fig. 1. Set out this triangle with an upright measuring 24ins. and a base line 9ins. Connect the two points as shown and then set out the width of material, which is 5 $\frac{1}{2}$ ins.

Square the ends across as indicated

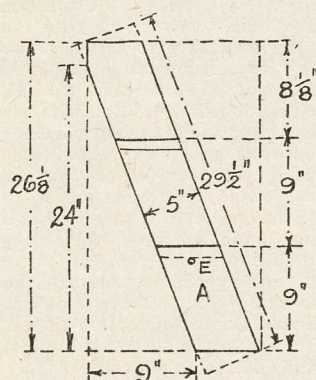


Fig. 1—How to mark out the sides

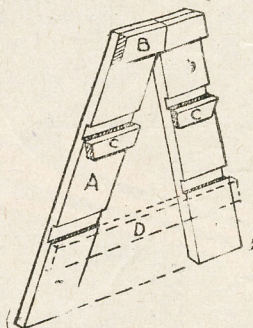


Fig. 2—The grooves and supports

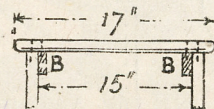


Fig. 3—View of top

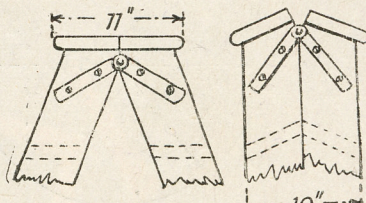


Fig. 4—How folding hinges are applied

by the dotted lines, after extending the height to 26 $\frac{3}{8}$ ins., which will give the total length of wood required, viz., 29 $\frac{1}{2}$ ins. Now erect the outer vertical line and upon this set out the height of the treads as 9ins. from the base line. Space out the lines for the actual treads or steps at $\frac{3}{4}$ in., and run these lines across parallel with the base line of the triangle.

Cut down the housings for the treads about $\frac{3}{16}$ in. deep and clean out the unwanted wood with the chisel. Take care in the cutting in of the housings to get two right hand and two left hand uprights. This can best be checked by laying each pair of uprights in position on bench or table before cutting.

Next get some lengths of stuff 2ins. by $\frac{3}{4}$ in. or $\frac{1}{2}$ in. thick and nail on as at B and C. The rail, B, can run right across and be nailed securely. The dividing line down the middle is cut later after the treads have been fitted. The rail, D, is temporary so far, and is for stiffening the uprights until the treads are fixed.

The Treads

The four interior treads will be 15 $\frac{3}{8}$ ins. long and they should fit snugly into their housings and be glued and nailed in, and to the bearers C and D. The interior portion of rail, D, inside the triangle Fig. 2, is cut away later. The topmost treads measure 17ins. by 5 $\frac{1}{2}$ ins. and they are nailed

through and glued to the brackets, B, Fig. 3. They should also be pinned to the uprights with hardwood dowel pins glued into the end grain. Hardwood pins might also be driven through the uprights into the ends of the treads as a further means of strength.

To guard against the results of rough usage, too, a $\frac{3}{8}$ in. iron bolt might be put through the two sides just below the lowermost treads and fitted with washer and nut and tightened (see E in Fig. 1).

The method of connecting the pairs of steps at the top is shown in Fig. 4. The special strap angle hinges are bought at any good ironmongery stores. They should be strong and stout and be put on with counter-sunk screws. As the extreme top steps overhang all round about 1in., they should be rounded off with rasp and glasspaper. The front edge of the four treads, too, should be rounded off and made smooth.

Toy Finish—(Continued from page 264)

soapy water, then the glasspaper dipped in the water, given a rub of soap, then rubbed on the paint. Because of the water, the paper does not clog so quickly, and the soap helps to lubricate the rubbing so there is less friction.

A further point about waterproof glasspaper is that no poisonous dust from the lead paint gets into the nose, mouth and lungs.

If dealing with cellulose paint, one needs to use a finer sort of abrasive paper, such as 320-grade stuff. Parts

need to be dealt with separately, and care must be taken not to rub unduly at edges. Thin coats of coloured cellulose paint, fine rubbings-down, and you will be absolutely sure of a superfine professional finish.

Metal workers will find pleasure in making this HANDY FLOUR SCOOP

THIS handy flour-scoop, although requiring rather more advanced workmanship than the previous jobs mentioned in these pages, should be quite within the scope of followers of our metal-working articles, and when finished, should prove a very useful asset in the kitchen.

The Scoop

To make the body, or actual scoop part, you will require a piece of fairly thin material, which can be easily bent by hand. Draw out the shape as the details at Fig. 1, paying particular attention to the measurements. After cutting to shape, it is easier to file up all edges at this stage, taking off burrs and smoothing all over with emery.

Mark off the edges that are to be lapped and throw off $\frac{3}{16}$ inch. You can do this with the aid of your bending blocks and a mallet. An alternative method is to hold the material in the left hand, and simply knock over the lap on the edge of your bench iron.

Lapping

If you decide to try the latter method, remember that on no account must you attempt to knock

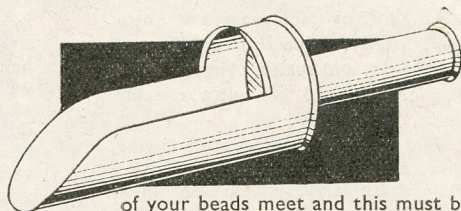
the countersinking of a joint. This is really quite simple, but the resulting edge presents a much neater appearance than a simple lap. All you have to do is to lay your job on a flat plate, with the lapped edges down.

Then, with a piece of straight, square wood or metal laid along the top side of the groove, sink your countersink by tapping lightly with a hammer. The diagram at Fig. 2 shows you the three stages of a countersunk lap. If you have done the job carefully and neatly, the edge should present a smooth bead with all raw edges of material carefully tucked away.

The next job is to shape your piece up and this can be done by bending gently but firmly round anything handy, providing it does not exceed 2 ins. in diameter.

Suitable Size

An ideal size would be about $1\frac{1}{2}$ ins., as this would enable you to give your material that extra bit of bend necessary to counteract its natural springiness. Do not forget to bend with the lapped edges inside and the countersink uppermost.



of your beads meet and this must be filled up smoothly with solder, using the tip of your iron.

To complete this portion of the scoop, you now require a backplate to blank up the circular end. As this piece has to support the handle, try to find a bit of rather stouter material as this will impart more rigidity to the finished job.

Cut out a circle, just a shade larger than the circular end of the scoop and file carefully down until it is a perfect fit and will just rest on the edge of your beaded edge without slipping inside.

Tack in position and then solder right round in one operation and without taking off your iron. This will leave a nice smooth finish and can be done quite easily if you see that your iron has a good heat before commencing.

The Handle

To make the handle, cut out a piece of thin material as per diagram (Fig. 1) and clean the edges well with emery as they all have to be soldered later. Lap and countersink one end and then bend into a tube, again with the countersink outside.

You can bend it round a piece of iron gripped in a vice, or alternatively, resting on your knees. As the lapped edge will be rather stiffer than the rest you may have to tap this into shape with a hammer. You should have a slight lap at the joint, and this must be gripped in position with the pliers, tacked and then soldered along the entire length of the seams.

Having got your handle into its tubular shape, the next job is to flange the open end. To do this, hold handle in the left hand, and, using sharp edge of bench iron, gently top about one-eighth over, using the round end of your hammer (see Fig. 3). If you take it right round a bit at a time, and gradually easing it over, you should have no difficulty.

Solder Splits

It is quite possible that a split may occur at the joint and if so, this must be soldered up before proceeding any further. Neglect of this would only increase the split, and in addition the end of the handle would soon lose its shape. It is important that this flange should be quite smooth and flat as it

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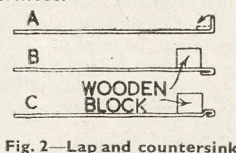
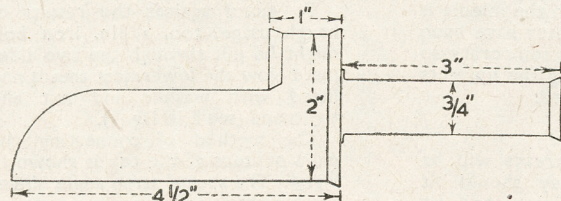


Fig. 2—Lap and countersink

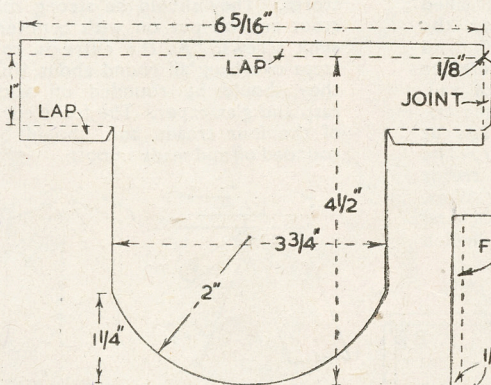


Fig. 1—Shape and sizes of parts required

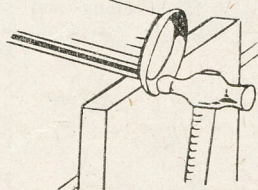
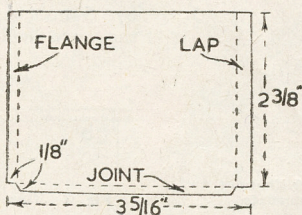


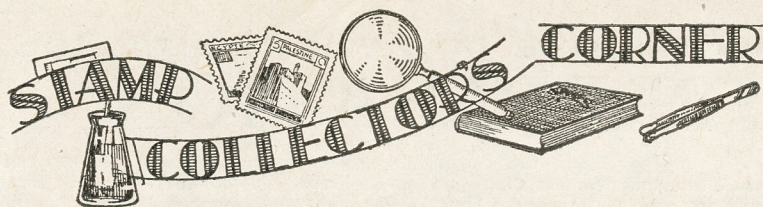
Fig. 3—Flanging the handle



over a small portion at a time, but must ease the whole lap down equally and gradually. Then, place your job flat down on the bench iron and tap the edges of the lap flat down.

Now we come to a process that you have not encountered before, namely,

Having bent to a nice circular shape, you will find you have a slight overlap at the joint. Grip the two edges firmly with a pair of pliers and solder securely, allowing the solder to permeate well into the joint. There will be a slight nick where the edges



Chemistry and Physics on Stamps

A LITTLE while ago we had an article on medical science and the difficulty that the writer had was to decide what to cut out rather than what to put in! This article is almost a continuation of that, except we shall confine ourselves to giving some examples of those who have spent their lives studying and so benefitting us in chemistry and physics.

Let us begin with a regret that no British men of science appear on any British stamps.



Let us take some of the chemists first. France, in 1927, issued a stamp to commemorate the 100th anniversary of the birth of Marcellin Berthelot. He was born in Paris.

First he was a schoolmaster, then an inspector of education. In 1886 he became Minister of Education and in 1895 Minister of Foreign Affairs. He wrote many books—some on the history of chemistry and some on explosives and organic chemistry. Our first illustration is of this man.

One particular reason why this illustration is given is because there is another Frenchman with a rather similar name who is also a chemist but who lived much earlier. Claude Louis Berthollet was born in 1748, and died five years before Marcellin was born. His chief work was in connection with ammonia and chlorine. He was a friend of Lavoisier whose portrait also appears on a French stamp, issued in 1943, to mark the 200th anniversary of his birth. Lavoisier at the age of 25 was elected a member of the Academie des Sciences.

An Unfortunate Beheading

His principal work was in developing the true explanation of the burning of substances. He and Priestley, in England, were working on the same thing at the same time without knowing it, for it was not as easy in those days to communicate with anyone as it is now. Unfortunately Lavoisier came under suspicion during the reign of terror and met his death at the guillotine in 1794.

Another great French scientist appears on many of the French stamps. All collectors will be able to pick out for themselves the portrait of Louis Pasteur, who was born at Dole in 1822. One could easily write

a book on the life of this man. As professor of chemistry at Dijon then Strassbourg, Lille and Paris, he did research on tartrates.

He was called to the South of France to investigate the difficulty of the wine merchants—why the wine should turn sour. This was a very serious matter for that region which depended on the quality of the wine for its prosperity. He discovered the trouble and the remedy, and when he was called to deal with the silk worm disease, again he was successful. After that he turned his energies in the same direction as had Robert Koch (mentioned in the medical science article) namely anthrax. Then he went on to fowl cholera, rabies and diphtheria. He died in 1895.

A Russian Chemist

The next illustration is of a clever design, as well as of a famous chemist, Dmitri Ivanovitch Mendelyeev. He was born in Silesia in 1834. When he was 13 his father died leaving his mother without much money to educate the large family. She took Dmitri first to Moscow to try to get



Fig. 2—Dmitri Mendelyeev



Fig. 3—André Ampère

him into the university but could not manage it. So she tried St. Petersburg, as it was then called, with success.

He studied chemistry and became professor, but later went to the Bureau of Weights and Measures. If you look carefully at the stamp you will see that the background is made up of squares with letters in these squares. It is for this that Mendelyeev is famous.

He arranged the known elements in a special way, the ninth under the first and the seventeenth under that and so on. What was rather remarkable was that he had to have three spaces, as he found that if he did not, the elements were in the wrong place. After having made these spaces he prophesied that elements would be discovered to fit into these,

and he was right. You should notice his hair in the portrait, for it is said that Mendelyeev only had it cut once a year.

Amps

Now to physics. André Ampère was born in 1775. He had poor health but was passionately fond of mathematics. Like many great men he was absent-minded. Frequently he cleaned his blackboard with his handkerchief and wiped his brow with the duster.

Once when going to the university he noticed a pretty stone on a bridge. He picked it up and examined it. Looking at his watch he saw that he was late so he threw his watch into the river and put the stone into his pocket! He may have been forgetful, but we remember him by naming the practical unit of current after him—the ampère.

France, in 1937, issued a stamp bearing the portrait of René Descartes and a book with the words "Discours sur la methode". Immediately afterwards there was another stamp, similar, but with the words "Discours de la methode". Born in Tours in 1596, the son of a wealthy man, he, like Ampère, was delicate and was brought up in a very selfish manner.

An Odd Chance

He never seemed to want to do anything useful, until one day when he was in the Army he saw a placard which was a challenge to anyone to do a problem in geometry. Descartes went home, spent a few hours at it, and solved the problem. This started an interest that continued to the end of his life. It was in 1637 that he published the book which is commemorated on the stamp.

Well, there you have a little about some of the scientists who appear on



Fig. 4—René Descartes

stamps. There are plenty of others for you to find—A. G. Bell on Canadian, T. A. Edison on U.S.A., Galvani, Marconi, and Volta on Italian, Guericke on German. The only Englishman is on the stamps of Ecuador—Charles Darwin

You can increase your pleasure by giving thought to HIKING PREPARATION

TRAMPING or hiking, in the popular vernacular, is now a favourite all-the-year-round pastime and form of holiday with thousands of young—and not so young—folk. This is not surprising, for no other method of spending a week-end, your annual, or even a one-days' escape from your ordinary routine, is pleasanter, cheaper or healthier.

Spring and summer are the most popular seasons, as is only natural. As soon as the longer days come round and the trees begin to leaf, one's feet begin to twitch to take the road.

The beauty of the awakening earth, the new fragrance in the air, the flowers of meadow and lane, the freedom of the hills and moors, the song of birds, the springy turf, and all the joys of the outdoors are within reach as you take the footpath way.

Join a Club

There are many newcomers to the rambling and tramping cult each spring. To get the best out of it you should 'know the ropes'. And to gain this end it is advisable to join a club. There is a rambling club nowadays in practically every town of size in this country.

Young folk, especially, reap many advantages by linking up with other hikers. Apart from the knowledge gained from the experience of others, there is good fun in the company of jolly companions when on trek. Subscriptions are moderate.

There is wisdom too, in becoming a member of the Ramblers' Association—particulars of the aims and objects from The Ramblers' Association, 20 Buckingham Street, Strand, London, W.C.2. The District Federations function as centres of information with regard to footpaths, routes, and facilities for visiting places of natural beauty and other interesting spots. You will find them helpful in many ways.

Youth Hostels, etc.

One cannot praise too highly the Youth Hostels. Starting in a small way in 1930, the Y.H. Association has now over two hundred hostels,

planned in 'chains' set out, on an average, of about 15 miles apart, and hikers are enabled to spend a short or long holiday without having to seek for accommodation other than at hostels.

Armed with a membership card, you can get a bed and other facilities for a very modest sum per night. At some hostels, meals can be had at moderate charges, whilst at others there are means provided whereby you can cook your own food.

The Youth Hostels enable ramblers to enjoy a holiday in the cheapest and most delightful way. You meet good companions and often cement lasting friendships. Moreover, you quickly learn all that is to be learnt about the 'gentle art of tramping' from the fellows met in the common room at the Y.H. The address is Youth Hostels Association, 18 Bridge Road, Welwyn Garden City, Herts.

In Scotland the S.Y.H.A. fills a similar place in the hiker's life.

The C.T.C. houses too, are a great boon. These houses are to be found in most resorts, and members of the Cyclists' Touring Club enjoy certain privileges when staying there.

Those who desire to go hike-camping might well join the Youth Camping Association, and so get access to hundreds of camping sites scattered throughout Britain. If you desire to know more, write to Secretary, Camping Club of Great Britain and Ireland, 38 Grosvenor Gardens, London, S.W.1.

Maps and Books

The beginner is recommended to obtain maps of the district he lives in, and also any others of areas he desires to explore on his week-ends and holidays. It is as well to browse over your maps thoroughly before you decide on routes, etc. Get to know the lie of the land.

Buy Ordnance Survey maps having a scale of One Inch to One Mile; these are the best of all. Remember, to the hiker, a map of the region he tramps in is an indispensable item, a guide, a friend, a panorama, and his 'chart o' dreams'.

A little study of an O.S. sheet will quickly make it all clear to you, and afterwards, with the addition of actual tramping and map-reading you

need fear no stretch of open moor or heath. Memorise the conventional signs and symbols shown in the bottom left-hand corner of each sheet to enable you to read your map quickly and easily.

Many books by experts are available, giving details of tramps in various parts of the country—moor and mountain tracks, river valleys, etc.—and the best routes. Consult your local library.

Training

Do not think that you can start straight off on a long tramp without any training. Actually, you can, but you will not be happy, and it might spoil your love for the open road.

It is far better to train for it. Commence by taking fairly stiff tramps at the week-ends over footpaths and over rough tracks and lanes. Just a few miles at first, gradually increasing until you can do an all-day walk without undue fatigue. If you do this, then, when the time comes for you to set off on a really long tour, you will be well-trained and in fit condition.

Remember, untrained and starting straight off from perhaps a sit-down job or a semi-sedentary one in the town to the hard going of tramping on hilly paths and over heather and moss, or even in the country lanes, you find yourself handicapped. The first day you push along full of enthusiasm—but you are 'whacked to the wide' the next day.

Footwear

In this connection your foot-gear plays an important part. Obtain a stout pair of good walking boots—not shoes—with hob-nailed soles. Break in new boots until your feet are quite comfortable in them. Keep your foot-gear well oiled or lubed to render the leather soft.

Should you develop a blister during the breaking in of new boots, dip a needle in iodine, and puncture the 'bleb' both sides so that the fluid will run out. Then smear a little Vaseline over a patch of Elastoplast and apply. To Vaseline your toes and heels before starting off in brand-new boots, will often prevent sores and blisters from developing. Wear good woollen socks, or stockings.

Flour Scoop—(Continued from page 266)

is to form the joint between the handle and scoop backplate.

To finish off the handle, cut out a small circle, file to a perfect fit, and blank up the opposite end of the handle.

The Assembly

Your two parts are now completed and all that remains is to get them

together. Measure the diameter of the flanged end of the handle, and, with the compasses, inscribe a suitable circle on outside of backplate. Hold the scoop, backplate uppermost, between the knees, and place handle in position. Tack first, and then view from all angles to make sure it is quite straight and square. Then solder firmly, leaving a slight

body of solder round the edge of the flange for strength.

To finish the job off, file all surplus solder away, and give the whole a thorough rubbing with coarse, and finally smooth emery. Rub all over with a damp rag to remove traces of flux and put in a warm place to dry.

The scoop can be enamelled in white or cream to give a smart finish.

Some practical advice on the proper method of MOUNTING PHOTOGRAPHS

MOST photographs are improved by being mounted, even quite small ones. That is why pictures look so much better in an album, for here they are mounted, although not on separate sheets.

For framing, passe-partout, standing on an easel, etc., photographs are mounted on card, going either straight on the material or with an intermediate rectangle of paper which shows as a thin border right round.

Any good card will make a mount, but mounts can be bought quite reasonably from photographic dealers in a variety of shades. The tint is

important for the effect of a print can be entirely lost if located on an unsuitable surround.

Thus, sepia prints should have mounts of cream or other warm colour, while black - and - white pictures show best on grey or white backgrounds. Nothing looks worse than, say, a black-and-white print on a sepia mount.

Position

Some mounts have a position for the print marked, but others are just plain card and then the fixing of the position must be given care. Curiously, if a picture is located right

in the middle, a "dropped" appearance is given, as though it were set too low. This is counteracted by setting the print much higher than would at first seem necessary.

A good rule is to have the two side margins and the top margin the same width but the bottom one half as wide again. It is not always convenient to have the top margin equal to the side ones, but even so it must be much narrower than the bottom one.

Trim before Mounting

Trimming the print before mounting is also important. It is a sound rule to trim so areas and items of main importance fall on lines which divide the picture into 'thirds'. That is, if you imagine two lines drawn horizontally across the print making three strips of equal width, and then three lines dividing the area into three equal vertical strips, the important items or masses should fall on these lines. The strongest points (for the most important items) are where the lines intersect.

Actually it is a very simple rule and most pictures can be trimmed to conform with it. If the subject will not fit exactly then it should be trimmed to meet the rule as near as possible. Tests with a few old prints will soon prove that this law of 'thirds', as it is called, does help to 'make' the picture.

If cutting your own mounts for simple stiffening or easel-standing the edges of the card should be bevelled for neatness. For passe-partout or other forms of framing this does not matter. The bevelling can be effected by cutting with a sharp blade—knife or razor—against a bevelled straight-edge.

Fixing the Picture

Having trimmed your pictures and obtained the mounts the next thing is fixing the prints in position. For this purpose either a wet or dry method can be adopted. The dry method is undoubtedly the better as it quite eliminates any danger of the prints cockling—a danger that is always present when wet pastes are used.

Dry mounting is effected by placing between the print and the card a thin sheet of paper (virtually a tissue paper) which is strongly impregnated with shellac. Print, tissue and card are carefully placed together and heat is then applied. The shellac melts and acting as a glue binds the three firmly. No dampness of any kind comes into the process.

So much for the general idea—now for details. The adhesive sheets are bought at any photographic dealers as 'mounting tissues'. They can be obtained in various sizes and it is as

GARDEN BOOT SCRAPER

THIS is a handy gadget for use outside the garden door, to scrape the mud off one's boots instead of carrying it in the house. It is quite a simple affair, made from a piece of board, 8in. thick, and a piece of sheet metal.

The uprights, A, are cut 1in. wide, some 6ins. at the top of each being shaped up a little for convenience in handling. Just below the handle chisel out a mortise for the cross rail, B. This rail is cut 1½ins. wide to the length given, plus the tenons. The bottom sides, C, also cut from the ¾in. board, are bevelled off each side of the centre, and are grooved ¼in. deep on their outer sides for the uprights to fit in.

Assembly

The whole can now be glued and screwed together, but take care to keep the uprights parallel, and if in doubt about this it will be wise to temporarily nail a spare piece of wood across at the bottom to ensure it.

The scraper, D, can be a piece of any fairly stout metal that can be found. The stouter it is, within reason, the longer it will last. This should be drilled at each end and be

then screwed across the up-rights just above the sides, as shown in the finished drawing. At this stage the whole can receive either a coat or two of paint, or creosote.

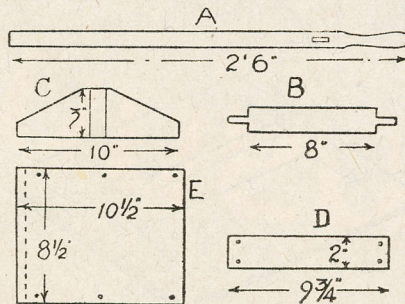
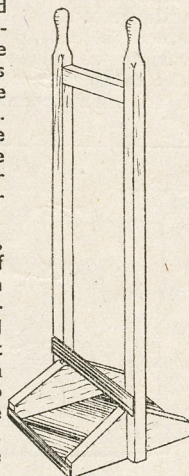
The bottom, E, is a piece of sheet metal, iron will suit excellently. It should be of fairly stout gauge, and if such a piece is not to be found in the junk box it could, most likely, be obtained from any local engineering shop, or blacksmith's.

If an old-fashioned tea tray is available, one of the old japanned iron kind, once so popular, it would supply just the right gauge of material required.

Cut the metal to the size shown, and drill or punch a row of screw holes near the side edges. Just ½in. of one edge is turned up at right-angles, then the bottom can be screwed to the sides. The idea of the metal bottom is to provide a tray to catch the scrapings of mud and allow them to be carried away and not left in an untidy heap.

The metal parts should receive a coat of brunswick black, or other suitable paint, then the scraper can be placed in position, ready for use.

Make all parts and joints strong and rigid to withstand rough handling.



The shape and size of parts needed

well to get tissues a shade larger than the prints you wish to mount.

How to Work

For carrying out the mounting a firm table top or board is required and a hot iron. An ordinary electric iron will do if kept the right temperature by careful switching on and off. Lay the print to be mounted face down and place a tissue over it, seeing that it comes over the edges all round.

Now touch the corners with the point of the iron so that the sheet will just hold to the print. Turn the two over. The sides are now trimmed, using a very sharp blade so the edges of the paper and adhesive agree exactly.

The position that the picture is to occupy on the mount should be marked out previously, dots showing where the corners are to come. The print and tissue are now alined with the dots and covered with a sheet of thin tin or some thickish brown paper. The top edge must agree with the top edge of the print so the position is not lost.

When all is ready the hot iron is passed steadily over the whole surface for a few moments. If all has gone well the picture will be firmly

affixed to its new base.

If the tissue adheres to the print, but not to the card, the iron has not been hot enough. If, on the other hand, the tissue sticks to the card but comes away from the print, it has been too hot. Which raises the point as to what is the right heat for the iron for the final pressing.

Actually it should be just above boiling point and this is best found by dropping a little water on to the hot metal. If it sizzles but does not at once evaporate the heat is just right. The iron at this temperature should be applied for about 20 to 30 seconds and as much pressure as you can comfortably put on should be used. The official 'mounters' for tissue work are in the nature of a press, both heat and pressure being brought to bear together.

Special Mountants

If you do not wish to employ the tissue method, prints can be well mounted with a wet adherent. The paste used, however, should be very dry as the less dampness given to the print the better.

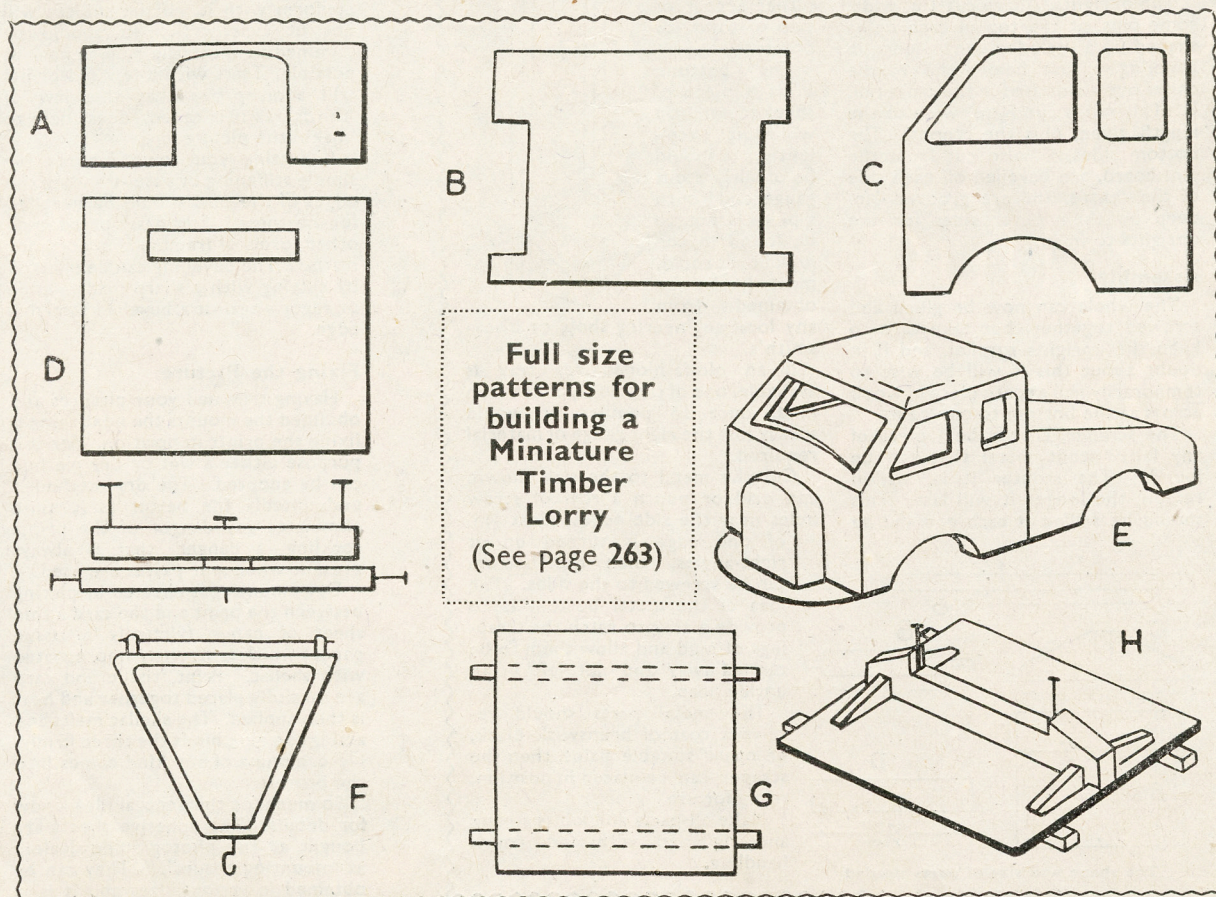
Several photographic firms sell mountants of this type, dextrine usually being the main component. Such an adherent can be made at

home by mixing $\frac{1}{2}$ lb. of the best white dextrine with sufficient cold water to make a smooth paste of thick consistency. Add more water or dextrine as needed. When thoroughly mixed put in 20 or 30 drops of oil of cloves and 5oz. of water.

Now boil in a small pan until the mixture is clear and bottle in a jar with screw lid. When cool it is ready for use.

A mountant thus made is very economical, as a little on the finger rubbed well in will cover quite a large surface. The print to be mounted is placed face down on a firm surface and the adherent worked into the back. The position having been previously marked, the print is laid on the card and at once rubbed over with a clean cloth, pressing from the centre out towards the edges.

Now place under pressure and leave until dry. It is always as well when putting things to press to take them out for inspection a few moments later. This makes sure that the surface is not sticking anywhere by the adherent getting inadvertently on the front. At this stage no damage will have been done and the unwanted spot can be removed. Later it is different.



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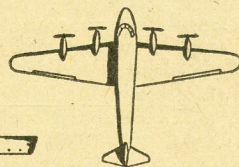
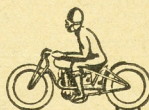
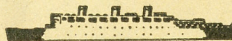
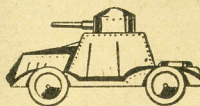
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